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**(57) Abstract:** A method and apparatus are disclosed that enable an over-the-horizon radar (OTHR) system to detect and track multiple target classes simultaneously. Each target class is defined by a range of speeds and accelerations of tracked objects. The OTHR is tasked in a staring mode, using a bandwidth and waveform repetition frequency that enable detection of Doppler shifts from all target classes with sufficient clutter reduction and range resolution. The radar backscattered energy is pre-processed and the resulting data are digitally sampled and provided to multiple buffers. Each buffer is associated with a specified target class. The data in each buffer are processed independently, thus the OTHR system can detect and track targets in multiple target classes simultaneously. An automatic tracking algorithm depicts target progress on a single digital map for all target classes.



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